47° 33′, W. 47° 27′, light field ice; N. 45° 41′, W. 47° 36′, several small icebergs: N. 45° 10′, W. 48° 12′, three large bergs among field ice, one of which was about one-fourth of a mile long.

24th.—N. 45° 47′, W. 47° 17′ to N. 45° 47′, W. 47° 39′, three large bergs; N. 45° 27′, W. 47° 24′, one large and two small bergs; N. 45° 04′, W. 48° 21′, berg.

25th.—The whole eastern coast of Newfoundland was blockaded with ice. The steamers "Caspian" and "Miranda" were unable to get into Saint John's, N. F., on account of ice; N. 46° 17′, W. 47° 50′ to N. 45° 10′, W. 48° 14′, field ice and several bergs.

26th.—N. 46° 24′, W. 47° 28′, large berg three hundred feet long and two hundred feet high; N. 45° 59′, W. 47° 59′, two small bergs; N. 46° 15′, W. 47° 39′, large quantities of field ice; N. 46° 57′, W. 47° 42′, several small bergs and field ice; N. 45°, W. 51°, four bergs and field ice for four hours.

27th.—Thirty miles east of Scatari Island, heavy field ice, extending beyond view; N. 45° 17′, W. 47° 21′, two hummocks, estimated seventy feet out of water; N. 44° 50′, W. 48° to N. 45°, W. 49°, several floes of field ice; N. 46° 40′, W. 52° 55′, field ice; N. 44° 18′, W. 49°, large berg; N. 48° 30′, W. 48° 48′, two wide streaks of field ice; at 3.30 p. m., vessel completely jammed, engines stopped till 11.30 p. m.; N. 46° 13′, W. 41° 11′, field of ice, extending one hundred miles to the westward and as far north as could be seen.

27–28th.—N. 46° 10′, W. 47° 15′ to 45° 30′, W. 48° 40′, fields of ice; heavy packed ice and small bergs.

28th.—N. 44° 29′, W. 47° 40′, five large and several small bergs in fields of ice five to fifteen miles long; N. 46° 24′, W. 47° 29′, two bergs, and steamed for twelve hours through field ice; one hundred and thirty miles east of Saint John's, N. F., several large bergs; N. 44° 20′, W. 50°, field ice; N. 45° 06′, W. 58° 40′ to N. 44° 51′, W. 59° 40′, fields of ice.

29th.—N. 43°, W. 49° 35′, berg two hundred feet high and four hundred feet long; N. 45° 52′, W. 47° 59′ to N. 45° 22′, W. 49° 14′, continuous heavy field ice; N. 43°, W. 49° 10′, large berg; N. 44° 34′, W. 48° 40′, two bergs; N. 44° 29′, W. 47° 40′, large berg, one-half mile wide and one mile long.

29–30th.—N. 46° 50′, W. 46° 52′ to N. 45° 12′, W. 48° 50′, ice field.

30th.—N. 46° 50′, W. 46° 45′ to N. 45° 32′, W. 48° 15′, large fields of ice and several large and small bergs; N. 43° 19′, W. 48° 52′, very large berg; N. 45°, W. 47°, three bergs and large quantities of field ice.

31st.—N. 46° 05′, W. 47° 13′, large fields of densely packed ice and several bergs from one hundred to one hundred and fifty feet long and thirty to fifty feet high; N. 44° 38′, W. 60°, numerous streaks of field ice with a few large pieces; N. 43° 05′, W. 48° 56′, large berg about one hundred and fifty feet high.

FOG IN JANUARY.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for January, 1890, as reported by shipmasters:

Date.	Entered.		Cleared.		Date.	Entered.		Cleared.	
	Lat. N.	Lon. W.	Lat. N.	Lon. W.		Lat. N.	Lon. W.	Lat. N.	Lon. W.
	° ′	° ′	° ′	° ′		° ′	° ′	° ′	° ′
5–6	42 18	61 21	43 16	58 15	14	44 18	49 20	44 11	50 01
5–6	31 25	80 07	31 56	80 29	16	42 57	57 36	42 56	58 03
5–6	31 47	80 46	Off Tybee Island.		15–16	38 42	72 32	38 30	73 02
6	41 30	64 00	41 20	64 35	15–16	42 51	64 54	41 21	66 59
6	41 30	65 17	40 59	66 30	16–17	43 55	58 00	43 22	60 00
6	44 02	61 06	43 31	62 45	16–17	44 15	50 35	43 45	51 58
6–7	43 22	57 03	43 58	54 37	27	42 27	60 05	42 04	61 48
7	42 31	50 31	42 56	48 57	27–28	43 00	58 08	42 25	60 19
12	42 18	68 40	42 15	64 36	30	41 30	65 00	41 20	65 05
12–13	40 39	66 40	40 32	69 49	31	41 25	65 20	41 05	68 10
13–14	42 52	61 52	42 50	62 59					

The limits of fog belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on four dates; between the fifty-fifth and sixty-fifth meridans on nine dates; and west of the sixty-fifth meridian on eight dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks numbered two less than the average; west of the fifty-fifth meridian the dates of occurrence of fog were two less than the average for the last two years. Over and near the Grand Banks fog was reported on the 7th, 14th, and 17th, with the approach and passage to the northward of areas of low pressure, and on the 16th, with the advance over New England and Nova Scotia of an area of low pressure. Between the fifty-fifth and sixty-fifth meridians fog was generally reported attending or following the passage to the northward of areas of low pressure, and was preceded or attended by rain. West of the sixty-fifth meridian fog generally occurred with south to east winds and rain, attending the approach or passage to the northward of areas of low pressure. Along the immediate coast of the United States fog was more generally noted on the 5th, when it occurred at Nantucket, Mass., and Block Island, R. I., in the evening, with an area of low pressure central over the Lake region; on the 6th at Portland, Me., and Boston, Mass., attending the passage of a storm-centre over New England; on the morning of the 12th at Nantucket and Wood's Holl, Mass., Block Island, R. I., New London, Conn., and New York City, with the passage of an area of low pressure from the Lake region over New England; and on the morning of the 13th at Nantucket, Wood's Holl, and Boston, Mass., Portland, Me., Block Island, R. I., New London, Conn., and Atlantic City, N. J., with the passage of an area of low pressure from the Lake region to Nova Scotia.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for January, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

For January, 1890, the mean temperature was highest over southern Florida, where it was above 70°; the highest mean reading, 73°.4, being reported at Key West. The mean values were above 60° over southern Georgia and in the southern parts of the east and west Gulf states. South of a line traced irregularly south of west from the coast of Virginia to extreme western Texas, and in southwestern Arizona and extreme southern California, the mean temperature was above 50°. The mean temperature was lowest in the lower valley of the Red River of the North, in Manitoba, and the eastern part of the British Northwest Territory, where it fell to or below —10°. The mean readings were below zero north of a line traced from northeastern Minnesota southwestward to south-central North Dakota and thence west-northwest to the British Possessions north of western Montana; they were below 10° north of a line traced from Prince Edward Island, Gulf of Saint Lawrence, westward to Lake Superior, thence irregularly southwestward to southern South Dakota, and thence irregularly west-northwestward to northwestern Montana, the mean values also fell below 10° in the more elevated parts of west-central Colorado. North of a line traced from

Massachusetts irregularly westward to central lower Michigan, thence west-southwest to northern New Mexico, thence irregularly west-northwest to north-central California, and east of this line continued northward over Oregon and Washington in about longitude west one hundred and twenty-two the mean temperature was below 30°.

The mean temperature for January, 1890, was above the normal east of a line traced from extreme northwestern Minnesota irregularly southwestward to south-central Arizona; to the westward of this line, and in the Canadian Provinces bordering on the Gulf of Saint Lawrence, the mean temperature was below the normal. The most marked departures above the normal temperature were noted from the Atlantic coast between the thirty-fourth and forty-first parallels westward over the lower lake region and the Ohio Valley, and thence southward over the middle and lower Mississippi valleys, eastern Indian Territory, and eastern Texas, where they exceed 10°; and the greatest departures below the normal temperature occurred in northern Montana and the British Possessions to the northward, where they were more than 10°.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.	°	Below normal.	°
Cleveland, Ohio	13.0	Fort Assinniboine, Mont	12.1
Brownsville, Tex	12.3	Calgary, N. W. T	11.0
Vicksburg, Miss	12.2	Red Bluff, Cal	6.8
Washington City	11.8	Portland, Oregon	6.2
Cairo, Ill	11.6	Sydney, C. B. I	5.0

Along the Atlantic coast from New York to Florida, in the east Gulf states, and at stations in New Mexico and eastern Arizona the current month was the warmest January, while at stations in northern Montana, northern Nevada, and California it was the coldest January in the history of the Signal Service. Over the country east of the Rocky Mountains the warmest previous January shown by Signal Service records was that of 1880. For the current month the mean temperature along the Atlantic and east Gulf coasts and in New Mexico and eastern Arizona exceeded that of January, 1880, by 0°.4 at New York City, 0°.9 at Philadelphia, Pa., 1°.0 at Atlantic City, N. J., 1°.1 at Baltimore, Md., 1°.9 at Washington City, 0°.4 at Lynchburgh, Va., 2°.0 at Norfolk, Va., 0°.6 at Charlotte, N. C., 2°.0 at Wilmington, N. C., 1°.0 at Charleston, S. C., 0°.4 at Southport, N. C., 0°.7 at Savannah, Ga., 0°.9 at Jacksonville, Fla., 2°.5 at Cedar Keys, Fla., 3°.1 at Atlanta, Ga., 2°.7 at Pensacola, Fla., 2°.6 at Mobile, Ala., 0°.6 at Vicksburg, Miss., 2°.1 at New Orleans, La.; 0°.2 above mean of 1877 at Santa Fé, N. Mex.; 1°.6 at Fort Apache, and 1°.6 at Fort Thomas, Ariz., above means of 1887. At Block Island, R. I., the mean temperature was 0°.9 above the highest previous mean for January, noted in 1889. In the middle and northern plateau regions and along the Pacific coast north of the thirty-fifth parallel the coldest previous January shown by Signal Service records occurred in 1888. For the current month the mean temperature in the districts named was lower than that of January, 1888, by 4°.0 at Winnemucca, Nev., 1°.7 at Red Bluff, Cal., 0°.1 at San Francisco, Cal., and 0°.3 at Los Angeles, Cal. In southern California the lowest mean temperature for January was noted in 1882; on the middle-eastern slope of the Rocky Mountains in 1875; in the Mississippi Valley south of the Ohio River in 1886; in the Lake region, New York, New England, and Pennsylvania in 1875 or 1888; elsewhere the years of occurrence of the lowest mean temperature for January were irregular. In December, 1889, the greatest departures above the normal temperature were noted in the middle Mississippi, lower Missouri, and lower Ohio valleys, where they exceeded 15°, and the highest mean temperatures ever reported for December were generally noted east of the Rocky Mountains and south of the Lake region; while for the current month the greatest departures above the normal temperature were reported in the middle Atlantic states south of New York, at Lake Erie stations, and in the Ohio and lower Mississippi valleys, where they exceeded 10°, and the highest mean temperatures ever reported for January were noted along the Atlantic and east Gulf coasts. It will be observed that in December, 1889, the greatest absolute excesses in mean temperature occurred in the central valleys, while for the current month they were noted farther to the eastward. A further comparison of these months shows that the distribution of pressure over the eastern part of the country was similar; that in each month the pressure was abnormally high over the southeastern states; that the pressure in the south Atlantic and east Gulf states was higher and the departures above the normal pressure greater for the current than for the preceding month; and that the area of highest pressure was somewhat more to the eastward in January. In either month no storm-centres traversed the country east of the Mississippi River and south of the Ohio Valley, all of which conditions combined to cause an unusual prevalence of southerly winds east of the Mississippi and south of the Lake region, whereby the warmer air of more southern latitudes was drawn over the districts lying east of the Mississippi River.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for January for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for January, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly means for January, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Jan.	(2) Length of record.	(3) Mean for Jan., 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for Jan. Highest.	Year.	Lowest.	Year.
Arkansas.		°	Years	°	°	°		°	
Lead Hill	Boone	31.5	8	45.6	+14.1	45.6	1890	24.2	1886
California.									
Sacramento	Sacramento	46.8	24	38.4	— 8.4	52.7	1873	38.4	1890
Colorado.									
Fort Lyon	Bent	23.5	20	.....	.....	32.3	1880	13.0	1875
Connecticut.									
Middletown	Middlesex	24.5	22	33.7	+ 9.2	33.7	1890	17.3	1888
Florida.									
Merritt's Island	Brevard	61.0	7	69.6	+ 8.6	69.6	1890	55.3	1886
Georgia.									
Forsyth	Monroe	47.7	16	55.9	+ 8.2	59.4	1880	40.8	1884
Illinois.									
Peoria	Peoria	24.2	34	32.8	+ 8.6	40.9	1880	13.5	1857
Riley	McHenry	17.6	34	25.6	+ 8.0	33.2	1880	5.5	1875
Indiana.									
Vevay	Switzerland	30.7	24	43.9	+13.2	47.2	1880	23.0	1884
Iowa.									
Cresco	Howard	8.8	18	14.4	+ 5.6	26.1	1880	— 1.3	1883
Monticello	Jones	15.8	21	21.7	+ 5.9	32.9	1880	6.0	1883
Logan	Harrison	17.9	16	19.2	+ 1.3	34.4	1880	7.1	1886
Kansas.									
Lawrence	Douglas	26.5	27	27.4	+ 0.9	41.2	1880	14.3	1886
Wellington	Sumner	25.6	10	.....	.....	40.4	1880	17.6	1886
Louisiana.									
Grand Coteau	Saint Landry	51.0	7	64.0	+13.0	64.0	1890	47.4	1886
Maine.									
Gardiner	Kennebec	17.9	49	20.5	+ 2.6	26.7	1889	7.1	1844
Maryland.									
Cumberland	Allegany	29.6	31	40.7	+11.1	40.7	1890	19.6	1865, '67
Massachusetts.									
Amherst	Hampshire	23.3	54	31.8	+ 8.5	32.3	1889	13.5	1857
Newburyport	Essex	23.8	13	29.7	+ 5.9	33.1	1880	13.7	1857
Somerset	Bristol	26.3	17	35.4	+ 9.1	35.7	1880	19.4	1888
Michigan.									
Kalamazoo	Kalamazoo	20.9	14	31.2	+10.3	36.0	1880	14.0	1881
Thornville	Lapeer	21.4	13	32.9	+11.5	35.6	1880	15.6	1881
Minnesota.									
Minneapolis	Hennepin	8.3	25	9.6	+ 1.3	23.2	1880	— 4.4	1875
Montana.									
Fort Shaw	Lewis & Clarke	16.2	20	10.8	— 6.4	29.1	1872	— 2.2	1875
New Hampshire.									
Hanover	Grafton	17.3	52	23.0	+ 5.7	26.5	1838	6.8	1857, '88
New Jersey.									
Moorestown	Burlington	29.0	26	40.1	+11.1	40.1	1890	22.2	1867
South Orange	Essex	28.3	19	37.4	+ 9.1	37.6	1880	23.8	1884
New York.									
Cooperstown	Otsego	20.0	36	29.9	+ 9.9	31.6	1880	10.3	1857
Palermo	Oswego	20.5	36	29.4	+ 8.9	29.4	•	11.6	1888
North Carolina.									
Lenoir	Caldwell	35.6	18	46.5	+10.9	46.5	1890	30.2	1882
Ohio.									
N'th Lewisburgh	Champaign	27.3	58	38.0	+10.7	41.0	1880	14.0	1856, '57
Wauseon	Fulton	22.6	20	33.4	+10.8	37.7	1880	12.2	1875

Deviations from normal temperatures—Continued.

State and station.	County.	(1) Normal for the month of Jan.	(2) Length of record.	(3) Mean for Jan., 1890.	(4) Departure from normal.	(5) Extreme monthly mean temperature for Jan.			
						Highest.	Year.	Lowest.	Year.
		°	Years	°	°	°		°	
Oregon.									
Albany	Linn	37.5	12	†34.3	†—3.2	43.8	1887	22.8	1868
Eola	Polk	37.3	19	31.0	— 6.3	42.7	1874	29.7	1875
Pennsylvania.									
Dyberry	Wayne	20.7	25	31.6	+10.9	31.6	1890	13.9	1865
Grampian Hills	Clearfield	22.6	25	34.7	+12.1	35.0	1880	16.1	1867
Wellsborough	Tioga	24.7	10	35.8	+11.1	35.8	1890	19.1	1884
South Carolina.									
Statesburgh	Sumter	44.4	8	†54.6	+10.2	54.6	1890	39.0	1886
Tennessee.									
Austin	Wilson	36.6	21	50.2	+13.6	53.1	1880	28.2	1884
Milan	Gibson	33.3	6	47.9	+14.6	47.9	1890	27.5	1886
Texas.									
New Ulm	Austin	50.1	16	60.0	+ 9.9	63.7	1880	34.8	1875
Vermont.									
Strafford	Orange	15.6	16	22.3	+ 6.7	25.4	1889	6.9	1888
Virginia.									
Birdsnest	Northampt'n	39.3	21	49.6	+10.3	49.6	1890	33.7	1881
Wisconsin.									
Madison	Dane	16.6	27	22.6	+ 6.0	33.6	1880	4.1	1875
Washington.									
Fort Townsend	Jefferson	39.1	18	31.9	— 7.2	55.4	1888	29.6	1869

*1863, 1880, 1890. †Received too late to be used in discussion.

The above table shows that the mean temperature for the current month was the highest mean temperature ever noted for January at stations in Connecticut, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Florida, Louisiana, Arkansas, and Tennessee, and that at Sacramento, Cal., the mean temperature was the lowest ever reported for January.

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 88°, at Rio Grande City, Tex., on the 10th. The temperature rose to or above 80° at stations along the Atlantic coast south of the thirty-fifth parallel, in the lower Mississippi valley, from Indian Territory southward over central and south-central Texas, and in southwestern Arizona, and the maximum values were above 70° south of a line traced from the Atlantic coast in about latitude north 40° westward to Colorado, thence southward to south-central New Mexico, and thence westward to southeastern California. The lowest maximum temperature reported was 32°, at Saint Vincent, Minn., and the maximum values fell below 50° north of a line traced from the northern part of lower Michigan southwestward to central Iowa, thence northwestward to central North Dakota, thence southwestward to central Utah, thence westward to west-central Nevada, and east of this line continued northward over eastern Oregon and southeastern Washington, and thence westward to southwestern Washington. The reports of United States Army post surgeons and state weather service and voluntary observers show the following maximum temperatures in states and territories where the temperature was reported 80° or above: Citronelle, Ala., 84°; Fort Lowell, Ariz., 86°; Lead Hill, Ark., 81°; Breckenridge, Colo., 84°; Lake City, Fla., 89°; Camilla, Ga., 83°; Convent, La., 88°; Brookhaven, Kosciusko, and Port Gibson, Miss., 82°; Clarkton N. C., 85°; Conway, S. C., 81°; Fort Ringgold, Tex., 97°. At a number of the older established Signal Service stations in New England, the middle and south Atlantic states, the Florida Peninsula, the east and west Gulf states, the Ohio Valley and Tennessee, the lower and upper lake regions, the upper Mississippi and lower Missouri valleys, and the southern plateau region the maximum temperatures for the current month were the highest ever reported for January. The greatest excesses in the districts named were, respectively, Portland, Me., 4° above maximum of 1876; Philadelphia, Pa., 5° above maximum of 1876; Washington City, 5° above maximum of two or more preceding years; Charlotte, N. C., 4° above maximum of 1888; Cedar Keys, Fla., the same as maximum of 1877; Pensacola, Fla., 5° above maximum of 1882; Palestine, Tex., 1° above maximum of 1888; Memphis, Tenn., 5° above maximum of 1888; Sandusky and Toledo, Ohio, 5° above maximum of 1880 and 1876, respectively; Grand Haven, Mich., 4° above maximum of 1880; Springfield, Ill., 4° above maximum of 1880; Leavenworth, Kans., 2° above maximum of 1876; Fort Apache Ariz., 4° above maximum of two or more preceding years. In the south Atlantic states the highest previous maximum temperature for January was generally noted in 1879; in the lower Rio Grande valley in 1887; in the lower lake region in 1874; in the upper Mississippi valley in 1874 or 1880; elsewhere the periods of occurrence were irregular.

The lowest temperature reported by a regular station of the Signal Service was —39° at Fort Assinniboine, Mont., on the 5th. The temperature fell below —30° in the Valley of the Red River of the North and thence westward over North Dakota and the eastern half of Montana. The minimum values were below —20° in Minnesota (except along the shore of Lake Superior) and north of a line traced from eastern Wisconsin south of Green Bay westward to southeastern Idaho, and thence northwestward over the eastern part of Washington; they were also below —20° over northwestern Nevada. The minimum temperature fell below zero north of a line traced from the coast of northern Massachusetts, north of west to northern lower Michigan, thence southward over Lake Michigan to central Illinois, thence south of west to northern New Mexico and central Arizona, and east of this line continued northwestward to eastern California in about latitude north 38°, and thence northward over central Oregon and Washington. The highest minimum temperature reported was 65° at Key West, Fla., and the minimum values were above 40° over the Florida Peninsula and extreme southern Louisiana. The reports of United States Army post surgeons and state weather service and voluntary observers show the following minimum temperatures in states and territories where the temperature fell to or below zero: Martindale, Mont., —42°; Gallatin, N. Dak., —40°; Gunnison, Colo., —39°; Pokegama Falls, Minn., —38°; Niellsville, Wis., —36°; Fort Niobrara, Nebr., —34°; Soda Springs, Idaho, and Millbank, S. Dak., —31°; Fort Bridger, Wyo., —30°; Fayette, Iowa, —27°; Jordan Valley, Oregon, —24°; Orono, Me., and Fort DuChesne and Nephi, Utah, —23; Fort Spokane, Wash., —22°; Fremont, Kans., and West Milan, N. H., —21°; Fort Bidwell, Cal., and Crystal Falls, Mich., —20°; Conception, Mo., —19°; East Berkshire, Vt., —18°; Plattsburgh Barracks, N. Y., —15; Woodstock, Ill., —13°; Fort Marcy, N. Mex., —4°; La Fayette, Ind., and Lake Cochituat, Mass., —3°; and Blue Knob, Pa., —2°. Among extremely low temperatures reported for January of preceding years are: Poplar River, Mont., —63°, in 1885 (this is the lowest temperature ever reported for any month in the United States); Saint Vincent, Minn., —53°, in 1888; La Crosse, Wis., —43°, in 1873; Duluth, Minn., —41°, in 1885; Fort Sully, S. Dak., —39°, in 1883; Fort Klamath, Oregon, —39°, in 1888; Cheyenne, Wyo., —38°, in 1875; Eagle Rock, Idaho, —38°, in 1883; Dubuque, Iowa, —31°, in 1887; Winnemucca, Nev., —28°, in 1888; Indianapolis, Ind., —25°, in 1884; Burlington, Vt., —25°, in 1882; Oswego, N. Y., —23°, in 1885; Eastport, Me., —20°, in 1874; Albany, N. Y., —18°, in 1878; Whipple Barracks (Prescott), Ariz., —17°, in 1880; Washington City, —14°, in 1881; Fort Elliott, Tex., —14°, in 1888; Charlotte, N. C., —1°, Atlanta, Ga., —2°, and Little Rock, Ark., —5°, in 1886; Jacksonville, Fla., 15°, in 1886; Brownsville, Tex., 18°, in 1881; Red Bluff, Cal., 18°, in 1888; and Los Angeles, Cal., 30°, in two or more years. The lowest absolute minimum temperature for January of preceding years was generally noted in the south Atlantic, east and west Gulf states, and the Florida Peninsula, in 1886; in the Ohio and upper Mississippi valleys and Tennessee, in 1884; in the middle and northern plateau regions and on the Pacific coast, in 1888; elsewhere the periods of occurrence were irregular.

LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather for January, 1890, is shown on chart iv by a line traced from Hatteras, N. C.,

southwestward off the coast to east-central South Carolina, thence to Savannah, Ga., thence over extreme southern Alabama, Mississippi, Louisiana, and eastern Texas to Corpus Christi, Tex., and thence to the Rio Grande Valley above Rio Grande City, Tex. The western limit of freezing weather is shown by a line traced from the California coast in about latitude north 38° southwestward, inside of the coast line, to extreme south-central California. Compared with the limits of freezing weather for December, 1889, the line showing the southern limit for the current month was about two degrees farther south on the immediate Atlantic coast; about the same from the Atlantic coast to Louisiana; and two to three degrees farther south in Louisiana and eastern Texas. On the Pacific coast the line of freezing weather was about four degrees farther south on the California coast and about three degrees farther west along the southern border of the country.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges of temperature occurred from eastern and central Montana southeastward over the western part of the Dakotas, and at Denver, Colo., where they equalled or exceeded 80°, whence they decreased eastward to the eastern part of the upper lake region, where they were less than 50°, and thence increased eastward to northern New England, where they were more than 70°. From the upper Missouri valley the monthly ranges decreased southeastward to less than 20° in southern Florida, southward to less than 40° on the west Gulf coast, southwestward to less than 60° in southern Arizona, and to less than 40° in southern California, and westward to less than 30° along the middle and north Pacific coasts. In northwestern Nevada the monthly ranges exceeded 70°.

The following are some of the extreme monthly ranges:

Greatest.	°	Least.	°
Fort Maginnis, Mont.	87.0	Key West, Fla.	15.0
Valentine, Nebr.	83.0	San Francisco, Cal.	23.0
Denver, Colo.	80.0	Fort Canby, Wash.	27.0
Carson City, Nev.	72.0	San Diego, Cal.	31.0
Northfield, Vt.	71.0	Galveston, Tex.	39.0

FROST.

An unusually heavy frost was reported at Keeler, Cal., on the 6th; on the 17th potato vines, strawberry blossoms, and sprouts on fig trees were reported killed at Hammond, La.; and on the 16th and 17th cane sprouts were reported nipped by frost at Grand Coteau, La. No frost was reported in Florida, save in the extreme north-central part on the 17th. Frost was reported along the Gulf coast from Mobile, Ala., to Corpus Christi, Tex.; along the southern border of the country from Texas to the Pacific coast, and generally over California. Compared with December, 1889, the southern limit of frost along the Atlantic coast for the current month was about 3° farther north; along the middle Gulf coast the southern limit was about the same; on the west Gulf coast frost occurred 2° to 3° farther south in December; from Texas westward frost was reported to the extreme southern boundary of the country and along the California coast for each month. In the south Atlantic and Gulf states frost was reported most frequently in Mississippi, where it was noted for thirteen dates; in Texas for eleven dates; in Georgia and Louisiana for eleven dates; in Alabama for nine dates; in South Carolina for eight dates; and in Florida for one date. On the Pacific coast frost was reported in California for twenty-five dates; in Oregon for twenty-two dates; and in Washington for two dates. Frost was reported in seven of the south Atlantic and Gulf states on the 17th; in six on the 14th; in five on the 16th and 22d; in four on the 13th, 21st, and 23d to 25th; in three on the 18th; in two on the 9th and 31st; and in one on the 1st, 8th, 10th to 12th, 19th, 20th, and 28th to 30th. On the 2d to 7th, 26th, and 27th no frost was reported in the south Atlantic or Gulf states. In California frost was reported on the 1st, 2d, 4th to 16th, 19th to 23d, 26th to 29th, and 31st; in Oregon on the 1st to 14th, and 16th to 23d; and in Washington on the 4th and 11th.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for January, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Boston, Mass.	41.8	33.5	8.3	39.1	32.4
Canby, Fort, Wash.	46.0	39.5	6.5	41.9	36.0
Cedar Keys, Fla.	75.0	62.9	12.1	70.7	66.0
Charleston, S. C.	61.8	55.8	6.0	59.3	59.3
Eastport, Me.	41.0	36.5	4.5	39.5	20.8
Galveston, Tex.	70.8	51.1	19.7	64.9	64.0
Key West, Fla.	75.5	71.9	3.6	74.0	73.4
Nantucket, Mass.	43.0	37.0	6.0	39.8	34.6
New York City.	43.0	36.4	6.6	40.0	40.2
Portland, Oregon	40.1	32.5	7.6	36.4	31.8

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for January, 1890, as determined from the reports of nearly 1,800 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The greatest monthly precipitation reported for January, 1890, was 33.40, at Upper Mattole, Humboldt Co., Cal., and the precipitation amounted to 20.00 in eastern California between the thirty-eighth and fortieth parallels and on the west-central coast of California. Within an area extending from southwestern Washington over western Oregon and northwestern California, and in areas in east-central Arkansas, south-central Indiana, south-central Illinois, southeastern Missouri, west-central Tennessee, and east-central Texas, the monthly precipitation exceeded 10.00. In areas in southwestern Arizona, south-central Colorado, north-central New Mexico, northeastern South Dakota, and at stations near the southern coast of Great Salt Lake, Utah, no precipitation was reported; and less than 0.50 fell in areas in southeastern California, central Florida, south-central Georgia, west-central Idaho, western Kansas, southeastern Louisiana, western Maryland, northern Minnesota, northeastern and eastern Montana, western Nebraska, northern, eastern, and western North Dakota, western Texas, southern and eastern West Virginia, and eastern Wyoming. In the Atlantic coast states the heaviest monthly precipitation occurred in central New York, where it exceeded 7.00; in the central valleys, in east-central Illinois, where it exceeded 14.00; on the eastern slope of the Rocky Mountains, in northwestern Wyoming, where it exceeded 6.00; in the plateau region, in east-central Nevada, where it exceeded 9.00; and on the Pacific coast, on the California coast north of the fortieth parallel, where it exceeded 30.00, and in eastern California between the thirty-eighth and fortieth parallels, and on the west-central California coast, where it exceeded 20.00.